Compilers

Valid Items

Syntax
CodeGen
Semantics
Types
The states of the DFA are

“canonical collections of items”

or

“canonical collections of LR(0) items”

The Dragon book gives another way of constructing LR(0) items
Item $X \rightarrow \beta.\gamma$ is valid for a viable prefix $\alpha\beta$ if

$$S' \rightarrow^* \alpha X \omega \rightarrow \alpha \beta \gamma \omega$$

by a right-most derivation

After parsing $\alpha\beta$, the valid items are the possible tops of the stack of items
An item $I$ is valid for a viable prefix $\alpha$ if the DFA recognizing viable prefixes terminates on input $\alpha$ in a state $s$ containing $I$.

The items in $s$ describe what the top of the item stack might be after reading input $\alpha$. 
• An item is often valid for many prefixes

• Example: The item $T \rightarrow (E)$ is valid for prefixes
  
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  ...
Using the automaton on the previous slide, choose the valid items for the prefix: \((\text{int } \ast\) 

- [ ] \(E \rightarrow (.E)\)
- [ ] \(T \rightarrow \text{int } \ast.T\)
- [ ] \(E \rightarrow .T + E\)
- [ ] \(T \rightarrow .\text{int}\)

To show the automaton, click “Hide Question” ↓